Docket No.: 4576/4551A (CON)
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:	:	
Galligan et al.	:	
	:	
Application No.: 10/612,658	:	Group Art Unit: 1754
	:	Examiner: Ngoc-Yen M. Nguyen
Filed: February 28, 2003	:	
	:	
For: METAL CATALYST CARRIERS-AND CATALYST MEMBERS MADE THEREFROM	:	

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Commissioner for Patents
P.O. Box 1450
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APPEAL BRIEF

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Real Party in Interest

The real party in interest in this proceeding is BASF Catalysts LLC, the predecessor in interest to the Assignee of record, Engelhard Corporation.

Related Appeals and Interferences

Neither Appellant nor its agents are aware of any prior or pending appeals, judicial proceedings or interferences which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 4 and 7-29 have been cancelled. Claims 1-3, 5, 6, and 30-36 stand finally rejected under 35 U.S.C. § 103(a) and are appealed. A copy of the claims on appeal are in the Claim Appendix of this Brief.

Status of Amendments

Appellant has not submitted any amendments after the final rejection.

Summary of Claimed Subject Matter

Claim 1 is directed to a refractory metal carrier comprising a tube of corrugated construction, the carrier having coated thereon an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent, the carrier being adapted for use in a conformable catalyst member. (Page 9, lines 16-30)[1]

Claim 2 depends from claim 1 and further recites that the carrier has a plurality of perforations formed around the periphery of the tube. (Page 10, lines 25-26.) Claim 3 depends from claim 1and further recites that the carrier has a catalytic coating on the

[1] Page and paragraph designations refer to those found in the originally filed specification.

anchor layer to provide a conformable catalyst member (Page 10, lines 3-6; 19-21.) Claim 5 depends from claim 1 and recites that the tube of corrugated construction comprises alternating rings separated by annular webs. (Page 10, lines 24-25.) Claim 6 depends from claim 1 and recites that the anchor layer is electric arc sprayed. (Page 10, lines 7-10.) Claim 30 depends from claim 1 and recites that the intermetallic anchor layer is selected from the group consisting of nickel, Ni/Cr/Al/Y, Co/Cr/Al/Y, Fe/Cr/Al/Y, Co/Ni/Cr/Al/Y, Fe/Ni/Cr, Fe/Cr/Al, Ni/Cr, Ni/Al, 300 series stainless steels, 400 series stainless steels, Fe/Cr and Co/Cr, and mixtures of two or more thereof. (Page 9, line 30 to Page 10, line 1.) Claim 31 depends from claim 1 and recites that the tube includes an elongate body portion which is dimensioned and configured to be mounted within a curved or bent pipe having an open discharge end, the carrier having coated thereon an anchor layer suitable for having a catalytic coating applied thereto, the carrier having a distal end and a proximal end, the proximal end comprising a mounting member dimensioned and configured to be secured to the open discharge end of the pipe when the body portion of the carrier is disposed within the pipe. (Page 5, lines 5-11.) Claim 32 depends from claim 31 and recites that the mounting member comprises an annular collar defining a mounting flange which is disposed radially outwardly of the proximal end of the catalyst member and extends in the direction from the proximal end towards the distal end thereof, whereby to define between the mounting flange and the proximal end of the catalyst member an annular slot which is dimensioned and configured to receive therein the open discharge end of the pipe, when the body portion of the carrier is disposed within the pipe. (Page 5, lines 12-18.) Claim 33 depends from claim 32 and recites that

the carrier has a catalytic material coated on at least some of the body portion of the carrier, to provide a catalyst member. (Page 5, lines 19-21.)

Claim 34 is directed to a refractory metal carrier comprising a plurality of perforated plate members having opposite faces and disposed in a face-to-face linear array to impart a cylindrical shape to the carrier and to form accordion pleats, the plate members having protrusions extending from their faces which space adjacent plate members from each other, the carrier having coated thereon an intermetallic anchor layer adapted for use in a conformable catalyst member that can be placed in a bent or curved configuration. (Page 9, lines 24-30; Page 10, lines 24-26; Figure 3.) Claim 35 depends from claim 34 and recites that the intermetallic anchor layer is selected from the group consisting of nickel, Ni/Cr/Al/Y, Co/Cr/Al/Y, Fe/Cr/Al/Y, Co/Ni/Cr/Al/Y, Fe/Ni/Cr, Fe/Cr/Al, Ni/Cr, Ni/Al, 300 series stainless steels, 400 series stainless steels, Fe/Cr and Co/Cr, and mixtures of two or more thereof. (Page 9, line 30 to Page 10, line 1.) Claim 36 depends from claim 34 and recites that the carrier has a catalytic coating on the anchor layer to provide a conformable catalyst member. (Page 10, lines 3-6; 19-21.)

Grounds of Rejection to be Reviewed on Appeal

I. Whether claims 1-3, 5-6, 31-34, and 36 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 4,455,281 (Ishida) in view of EP 0831211.

II. Whether claims 30 and 35 are unpatentable under 35 U.S.C. § 103(a) over Ishida in view of EP 0831211, and further in view of U.S. Patent No. 4,798,770 (Donomoto) or U.S. Patent No. 6,042,879 (Draghi).

III. Whether claims 1-3, 5-6, 30-36 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 5,204,302 (Gorynin) in view of EP 0831211, and optionally further in view of U.S. Patent No. 4,027,367 (Donomoto) and Ishida.

Argument I

Claims 1-3, 5-6, 31-34, and 36 in this application stand finally rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 4,455,281 (referred to as "Ishida" herein) in view of EP 0831211.

Claim 1

Claim 1 of the present application specifies a refractory metal carrier comprising a tube of corrugated construction, the carrier having coated thereon an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent, the carrier being adapted for use in a conformable catalyst member. Conformable means that the carrier containing the catalyst can be coated with a catalytic composition and then bent to the shape of a curved or bent configuration to enable insertion of the resulting conformable catalyst into curved conduits. (Specification, page 1, lines 21-22.)

Tube of Corrugated Construction

The examiner admits that Ishida does not teach a tube of corrugated construction. (Final Office Action, page 3, second paragraph.) EP 0831211 is cited in the Final Office Action for the alleged teaching that an exhaust emission control device can have a catalytic metal bearing (or support) member which can be porous metal shape, citing Figures 12-13, column 11, lines 39-42 and column 1, lines 11-19 or a corrugated porous plate, citing Figure 16C. A study of the cited passages and Figures in EP 0831211

reveals that the alleged catalytic member is not corrugated, but merely porous. As the skilled artisan understands, "corrugated" means a structure that has alternating ridges or grooves. No such structure is shown or suggested in the passages cited in the Final Office Action. The Final Office Action fails to explain how a porous member meets the limitation of "corrugated" in claim 1 of Appellant's application. The Final Office Action concludes that since EP 083211 contains a statement that steel sheet bearing catalytic member is not limited to the construction shown, this reference fairly suggests that the hollow cylinder can be made from other types of metal sheets, such as the corrugated porous plate of Figure 16C (Final Office Action, page 3, paragraph 3.) However, this statement assumes what it tries to prove, because Figure 16C merely shows a porous, non-tubular plate that is not corrugated. EP 0831211 fails to cure the deficiencies noted above in Ishida.

Carrier Tube that Can Be Bent For Use in a Conformable Catalyst Member

There is no teaching or suggestion in Ishida or EP 0831211 of carrier comprising a tube of corrugated construction that can be bent and retain the catalytic layer on the carrier or a carrier adapted for use in a conformable carrier member. Despite the explicit teachings in Ishida to the contrary, the examiner maintains that the plates in Ishida can be bent. Ishida, however, specifically states that the thickness of the metal plate "is preferably thin, but **toughness of the metal plate is required in order not to easily yield to deformation**." (col. 4, lines 51-53 (emphasis added).)

The Examiner to Figures 5-21 of Ishida for the proposition that substrate can be bent, however, Figures 5-21 do not show or suggest a carrier that is bent or capable of being bent. The carrier plates shown in Figures 3 and 4 are corrugated (but not tubes),

but Figures 3 and 4 do not disclose or suggest carriers that can be bent and retain the anchor layer on the carrier when the carrier is bent. Figures 3, 22, and 23 each show a plurality of plate-shaped carriers in a straight (not bent) stacked configuration, and there is no teaching or suggestion in Ishida to bend the plates so that the anchor layer is retained after bending. A person of ordinary skill in the art reviewing the specification and Figures 3, 22, and 23 of Ishida would be motivated to provide rigid plates that can be arranged in a stacked array, not tubes of corrugated construction that can be used in a conformable catalyst member. As discussed above, Ishida teaches that the plates should be sufficiently thick and tough so that the plates do not easily yield to deformation.

As discussed above, the carriers disclosed in Ishida must be rigid and non-deformable, and the carriers in EP 0831221 are also rigid and not capable of being bent because the corrugated cushion member, shown in Figure7, which does not contain any coating, is attached to the catalytic member which contains only a catalytic coating. As discussed above, the carriers in EP 0831221 do not include an intermetallic anchor layer. While the carrier disclosed in EP 0831211 may be tubular, it is **not adapted for use in a conformable catalyst member**, and it is not of corrugated construction merely because it is attached to a corrugated cushion member.

Accordingly, EP 0831211, like Ishida, fails to teach a carrier having an intermetallic anchor layer for retaining a catalytic material when the carrier is bent. The carriers of the catalytic bearing members in EP 0831211 are in the form of cylindrical sheets that are spot welded to corrugated sheet cushion member 22 so that the cushion member 24 deforms relative to the member 22 in the radial direction to accommodate different amounts of thermal expansion between the exhaust pipe 5 and the catalytic

member 22. (col. 7, lines 1-10.) Such a construction, in which the corrugated cushion member is fastened to the cylindrical catalytic member would not provide a carrier for use in a conformable catalytic member, but instead one that is rigid. Since the cylindrical substrates shown in EP 0831211 are not corrugated or adapted to be used in a conformable catalyst member as required by Applicants' claim 1, EP 0831211 fails to cure the deficiencies in Ishida, the Examiner has failed to establish a *prima facie* case of obviousness.

Ishida Teaches Away

Furthermore, the disclosure of Ishida, including the passage and the Figures discussed above, teach away from Appellants' claim 1, which requires a corrugated tubular metal carrier that includes an anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent. Claim 1 specifically recites that the carrier is adapted for use with a conformable catalyst member. Figures 3 and 3A provide an example of a conformable catalyst member, which is capable of being bent or curved to conform to bends or curves in an exhaust pipe. Ishida teaches away from such a metal carrier because Ishida requires the plate-shaped carrier to be resistant to deformation, and thus the carrier in Ishida could not be used in a conformable catalyst member. In this regard, Applicants point out that MPEP § 2141.02 requires that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." The Examiner's position that the disclosure of "thin" plates in Ishida teaches or suggests carriers that can be used in conformable catalyst members ignores the clear disclosure in Ishida that the plates should

be rigid and not deformable. In this regard, Applicants direct the examiner's attention to the discussion under MPEP 2141.02 of the *W.L. Gore* case:

W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) (Claims were directed to a process of producing a porous article by expanding shaped, unsintered, highly crystalline poly(tetrafluoroethylene) (PTFE) by stretching said PTFE at a 10% per second rate to more than five times the original length. The prior art teachings with regard to unsintered PTFE indicated the material does not respond to conventional plastics processing, and the material should be stretched slowly. A reference teaching rapid stretching of conventional plastic polypropylene with reduced crystallinity combined with a reference teaching stretching unsintered PTFE would not suggest rapid stretching of highly crystalline PTFE, in light of the disclosures in the art that teach away from the invention, i.e., that the conventional polypropylene should have reduced crystallinity before stretching, and that PTFE should be stretched slowly.).

The limitations conformable and corrugated tubes that retain catalytic coating when they are bent are the antithesis of the rigid structures that are not capable of deformation shown in Ishida and EP 0831221. Since neither Ishida nor EP 0831221 teaches or suggested a carrier comprising a corrugated tube, the Examiner has failed to establish a *prima facie* case of obviousness.

Anchor layer capable of retaining a catalytic coating applied to the tube

In a prior office action, the Examiner had relied upon item 22 in Figure 7 of EP0831211 as teaching a tube of corrugated construction. However, in EP 0831211, the corrugated sheet, item 22 in Figure 7, serves as a cushion for catalytic bearing member

22, which is in the form of cylinder. There is **no** teaching or suggestion in EP 0831211 of a corrugated tubular carrier that includes an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent and adapted for use in a conformable catalyst member. While item 22 in Figure 7 is a corrugated sheet, it **does not have a catalytic layer** or an intermetallic layer formed thereon and thus cannot be considered to be a carrier having an intermetallic layer thereon.

Furthermore, all of the catalytic bearing members disclosed in EP 0831211 do not include intermetallic anchor layers for retaining the catalytic coating. Instead, EP 0831211 teaches a carrier made from thin, porous steel sheets having a layer of catalytic material such as platinum or rhodium directly formed on the steel sheet in the shape of a cylinder surrounded by a corrugated, support member that does not include a coating. (column 6, lines 14-24; col. 5.)

The Final Office Action fails to explain why one skilled in the art would look to the teachings of EP 0831211, which does not include an intermediate layer on the catalytic steel sheets, to provide a tube of corrugated construction having an anchor layer for retaining a catalytic coating. According to the MPEP, § 2142:

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed

invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Here, the examiner has failed to provide any motivation for combining the teachings of Ishida, which requires substrate having an intermediate layer to retain the catalyst on a non-deformable plate-shaped substrate, with EP 0831211, which teaches a cylindrical substrate that does not include an intermediate layer. The rejection in the Final Office Action appears to be relying on impermissible hindsight to combine elements from the prior art to arrive at applicants' claimed invention.

In summary, neither of the cited references show or suggest a refractory metal carrier comprising a tube of corrugated construction, the carrier having coated thereon an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent and for use in a conformable catalyst member. The rejection in the Final Office Action that it would have been obvious to make the shape of the catalyst support member in Ishida into a corrugated tubular shape relies on improper hindsight, and the rejection should be withdrawn

Claim 2

Claim 2 depends from claim 1 and is directed to a refractory metal carrier having a plurality of perforations formed around the periphery of the tube. Thus, claim 1 is directed to a refractory metal carrier having all of the limitations of claim 1 discussed above plus a plurality of perforations around the periphery of the corrugated tube.

As discussed above, Ishida does not disclose or suggested a tube having a corrugated structure or one that can be bent or can be used in a conformable catalyst. Ishida also does not teach perforations around the periphery of a corrugated tube.

EP0831221 does not teach a corrugated tube have a perforations around it periphery. The examiner's citation to Fig. 16C is unavailing, as Fig. 16C shows a flat, non-corrugated plate with perforations. The rejection of claim 2 should be reversed.

Claim 3

Claim 3 depends from claim 1 and recites a refractory metal carrier having a catalytic coating on the anchor layer to provide a conformable catalyst member. As discussed above with respect to claim 1, the combination of Ishida in view of EP 0831221 does not teach or suggest a metal carrier comprising a tube of corrugated construction, the carrier having coated thereon an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent, the carrier being adapted for use in a conformable catalyst member. EP 0831221 does not teach or suggest a catalytic coating on an anchor layer, and instead teaches applying the catalytic coating directly to the catalytic bearing members. The Final Office Action fails to explain why one of skill in the art would modify the structure of Ishida, which includes allegedly includes an anchor layer on a rigid, flat substrate and substitute the structure of EP 0831221, which provides a rigid, curved substrate that does not include an anchor layer. In the Final Office Action, the elements of Ishida are listed and the elements of EP 0831221 are listed, but there is no statement or reasoning provided as to why one of skill in the art would substitute the structure in EP 0831221, which does not include an anchor layer, with the structure in Ishida, which contains an anchor layer. The only statement provided is that a corrugated, perforated tube would be desired for a catalyst used in an internal combustion engine. Considering the numerous applications for catalysts and the wide variety of shapes that catalysts can be depending on the

application, the Final Office Action appears to rely on impermissible hindsight in reasoning that a tubular, corrugated shape is desired for use in an internal combustion engine. Since the Final Office Action fails to establish a *prima facie* case of obviousness, the rejection should be reversed.

Claim 5

Claim 5 depends from claim 1 and further recites that the tube of corrugated construction comprises alternating rings separated by annular webs. Claim 5 is not specifically addressed in the Final Office Action, and there is absolutely no teaching or suggestion of the specific structure recited in claim 5 in Ishida or EP 08321221. Since the rejection of claim 5 relies on improper hindsight, this rejection should be reversed.

Claim 31

Claim 31 depends from claim 1 and is directed to a refractory metal carrier of wherein the tube includes an elongate body portion which is dimensioned and configured to be mounted within a curved or bent pipe having an open discharge end, the carrier having coated thereon an anchor layer suitable for having a catalytic coating applied thereto, the carrier having a distal end and a proximal end, the proximal end comprising a mounting member dimensioned and configured to be secured to the open discharge end of the pipe when the body portion of the carrier is disposed within the pipe.

Regarding claim 31, Ishida and EP0831211 do not teach or suggest a carrier having an elongate body portion which is dimensioned and configured to be mounted within a curved or bent pipe having an open discharge end, the carrier having coated thereon an anchor layer suitable for having a catalytic coating applied thereto, the carrier

having a distal end and a proximal end, the proximal end comprising a mounting member dimensioned and configured to be secured to the open discharge end of the pipe when the body portion of the carrier is disposed within the pipe.

The Final Office Action is silent with respect to claim 31. Nowhere in the Final Office Action is the limitation of the curved or bent pipe or a mounting member to be secured to the open discharge end of the pipe when the body portion of the carrier is disposed in the pipe. The Office Action fails to establish that claim 31 is obvious, and the rejection should be reversed.

Claim 32

Claim 32 depends from claim 31 and s directed to a refractory metal carrier wherein the mounting member comprises an annular collar defining a mounting flange which is disposed radially outwardly of the proximal end of the catalyst member and extends in the direction from the proximal end towards the distal end thereof, whereby to define between the mounting flange and the proximal end of the catalyst member an annular slot which is dimensioned and configured to receive therein the open discharge end of the pipe, when the body portion of the carrier is disposed within the pipe.

Ishida and EP0831221 do not teach or suggest the mounting member comprises an annular collar defining a mounting flange which is disposed radially outwardly of the proximal end of the catalyst member. The Final Office Action fails to provide any statement or reasoning as to why this claim is rejected.

Claim 33

Claim 33 depends from claim 32 and is directed to a refractory metal carrier having a catalytic material coated on at least some of the body portion of the carrier, to

provide a catalyst member. Like claim 32, there the Final Office Action fails to address why the specific structure recited in claim 33 is obvious. Because the Final Office fails to establish that claim 33 is obvious, the rejection should be reversed.

Claim 34

Claim 34 is directed to a refractory metal carrier comprising a plurality of perforated plate members having opposite faces and disposed in a face-to-face linear array to impart a cylindrical shape to the carrier and to form accordion pleats, the plate members having protrusions extending from their faces which space adjacent plate members from each other, the carrier having coated thereon an intermetallic anchor layer adapted for use in a conformable catalyst member that can be placed in a bent or curved configuration.

The limitations of independent claim 34 are not taught or suggested by Ishida and/or EP0831221. Claim 34 requires a refractory metal carrier comprising a plurality of perforated plate members having opposite faces and disposed in a face-to-face linear array to impart a cylindrical shape to the carrier and to form accordion pleats, the plate members having protrusions extending from their faces which space adjacent plate members from each other, the carrier having coated thereon an intermetallic anchor layer adapted for use in a conformable catalyst member that can be placed in a bent or curved configuration. Neither of the cited references teaches such a structure, namely a carrier with an intermetallic layer having a face-to-face linear array and forming accordion pleats. In addition, as discussed above with respect to claim 1, neither of the cited references teach a carrier that can be used in a conformable catalyst member that can be

placed in a bent or curved configuration. As noted above, Ishida teaches away from such a carrier plate. For at least these reasons, claim 34 is patentable over the cited references.

The office action fails to state particular reasons as to why claim 34 is obvious over the cited references. Reversal of the rejection is respectfully requested.

Claim 36

Claim 36 depends from claim 34 and is directed to a refractory metal carrier having a catalytic coating on the anchor layer to provide a conformable catalyst member. For at least the reasons provided above with respect to claim 34, claim 36 is patentable over the cited art. Similar to claim 34, there is no reasoning or discussion as to why claim 36 is obvious over the cited references.

Argument II

Claims 30 and 35 in this application stand finally rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ishida in view of EP 0831211, and further in view of U.S. Patent No. 4,798,770 (Donomoto) or U.S. Patent No. 6,042,879 (Draghi).

Claims 30 and 35

Claims 30 and 35 are directed to a refractory metal carrier wherein the intermetallic anchor layer is selected from the group consisting of nickel, Ni/Cr/Al/Y, Co/Cr/Al/Y, Fe/Cr/Al/Y, Co/Ni/Cr/Al/Y, Fe/Ni/Cr, Fe/Cr/Al, Ni/Cr, Ni/Al, 300 series stainless steels, 400 series stainless steels, Fe/Cr and Co/Cr, and mixtures of two or more thereof. For at least the reasons provided above in Argument I with respect to claims 1 and 34, claims 30 and 35 are patentable over the cited art. Donomoto et al. or Draghi et al. are cited for the teaching of an anchor layer comprising nickel and aluminum.

The deficiencies of Ishida and EP 0831211 are noted above with respect to claims. Neither Donomoto et al. nor Draghi et al. cures these deficiencies. Donomoto et al. pertains to a heat resisting alloy article having a sprayed, alloyed layer formed over a composite fiber/light alloy layer. There is no teaching or suggestion of a carrier comprising a tube of corrugated construction or of the structure recited in claim 34. Draghi et al. teaches coating apertured articles, but not the type of refractory metal carrier as recited in claims 30 and 35.

The Examiner relies upon Donomoto et al. to supply the teaching of Ni-Al alloys because Donomoto allegedly teaches that Ni-Al alloys are heat and corrosion resistant (citing column 5, lines 51-63 of Donomoto et al.)

The teachings of Donomoto et al. and Draghi et al. fail to cure a deficiency in Ishida et al., namely substitution of the intermediate layer taught by Ishida et al. with a layer containing Ni-Al. As the Examiner admits, Ishida et al. teach metal plates made of steel, and stainless steel plates (Ishida et al. col. 4, lines 59-61). The Examiner admits that Ishida et al. teach that the electric arc sprayed layer should be the same material as the metal plate (Final Office Action at page 4, and Ishida et al., col. 5, lines 9-10). The Examiner's stated motivation for substituting the metals taught by Donomoto et al. and Draghi et al. is that the "the teaching of Ishida '281 should not be limited to just the exemplified metals". (Final Office Action at page 4). The Examiner appears to take the position that because Ni-Al alloys are heat and corrosion resistant, one of skill in the art would substitute the Ni-Al alloys allegedly taught by Donomoto et al. or Draghi et al. with the materials taught in Ishida et al. It is respectfully submitted that the Examiner has used impermissible hindsight to combine Ishida et al. and Donomoto et al.

Donomoto et al. discloses coating a composite fiber/light alloy layer formed on a body with Ni-Cr-Al alloys by plasma spraying to form automobile engine parts such as pistons (see, claim 1 and the Abstract). There is no teaching or suggestion in Donomoto et al. of forming coatings on a carrier substrate by electric arc spraying to provide a catalyst member. As stated in MPEP Section 2143.01, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." Applicants respectfully submit that the Examiner has not provided proper motivation to combine the teachings of Donomoto et al. with the teaching of Ishida et al.

Regarding Draghi et al., this reference also discloses plasma spraying alloy coatings. There is no discussion about forming an intermediate layer on a catalyst member to improve adhesion of a catalytic material on an anchor layer containing nickel and aluminum. Draghi et al. teach that "[i]t is desirable to apply the MCrAlY coating by plasma spray process since plasma spraying is relatively inexpensive . . ." (see col. 4, lines 15-19). Applicants respectfully submit that the skilled artisan would not be motivated to combine Ishida et al. with Draghi et al. because the plasma spraying process would destroy the intended function of providing an intermediate metal alloy layer on a catalyst substrate that retains a catalyst material formed over the alloy layer formed by electric arc spraying.

It is respectfully submitted that none of the cited prior art references or the knowledge in the art generally teach that Ni-Al intermediate layers have improved heat or

corrosion resistance as used in intermediate catalyst layers. Neither Donomoto et al. nor Draghi et al. pertains to catalysts, and neither reference pertains to improving the bond between catalytic material formed on an anchor layer of a catalyst member. It appears that the Examiner has used impermissible hindsight to glean from Appellants' patent application that Ni-Al can be electric arc sprayed as an intermediate layer, and not from any fair teaching or suggestion in Donomoto et al. or Draghi et al. Accordingly, the Examiner has failed to establish a *prima facie* case of obviousness, and the rejection should be reversed.

Argument III

Claims 1-3, 5-6, 30-36 in this application stand finally rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,204,302 (Gorynin) in view of EP 0831211, and optionally further in view of U.S. Patent No. 4,027,367 (Rondeau) and Ishida.

Claim 1

Claim 1 of the present application specifies a refractory metal carrier comprising a tube of corrugated construction, the carrier having coated thereon an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent, the carrier being adapted for use in a conformable catalyst member.

The Final Office Action cites Gorynin for the alleged teaching of an adhesive layer of nickel and titanium, aluminum with at least one or more of Co, Cr, Mo, Ta, Nb, Ti or Ni, or silicon with at least one or more of Ti, Nb, Cr, W, Mo, Ni or Ta, citing column 2, lines 35-35. Although the Final Office Action states that the claims are obvious over the combination of Gorynin in view of EP0831211, the Final Office Action

provides no statement or reasoning as to why one skilled in the art would have combined the teachings of the two references other than "it would have been obvious to optimize such composition to obtain the best adhesive layer". (Final Office Action, page 5.) Applicants respectfully submit that the office action fails to meet the initial burden required to establish a *prima facie* case of obviousness. See, e.g., *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992) ("[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant.... If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent.").

As noted above with respect to the combination of Ishida and EP 0831211, EP 0831211 does not teach a corrugated, tubular substrate as recited in claim 1. Furthermore, Gorynin and EP 0831211 fail to teach or suggest carrier being adapted for use in a conformable catalyst member as recited in claim 1 that retains the catalytic material when the carrier is bent. For at least this reason, the rejection should be reversed.

Claims 2-3, 5-6 and 30-33

Claim 2 depends from claim 1 and is directed to a refractory metal carrier having a plurality of perforations formed around the periphery of the tube.

Gorynin fails to teach or suggest the refractory metal carrier having the structure of claim 1 and having a plurality of perforations formed around the periphery of the tube. There is no explanation or reasoning provided in the Final Office Action as to why the

skilled artisan would be motivated to combine the teachings of Gorynin with EP 0831211. As discussed above, EP 08313211 does not teach corrugated tubes, but merely provides tubular, non-bendable, non-corrugated porous tubes having a catalyst thereon. Since the Final Office Action fails to establish that claim 2 is obvious, the rejection should be reversed.

Claim 5

Claim 5 depends from claim 1 and is directed to a refractory metal carrier wherein the tube of corrugated construction comprises alternating rings separated by annular webs.

Gorynin and EP 0831211 fail to teach or suggest the structure recited in claims 5. In this regard, EP 0831211 is discussed above with respect to claim 5. There is no teaching or suggestion in Gorynin of a tube comprising alternating rings separated by annular webs. Again, there is no discussion of the particular limitations of this claim in the Final Office Action. The rejection of claim 5 should be reversed.

Claim 6

Claim 6 depends from claim 1 and is directed to a refractory metal carrier in which the anchor layer is electric arc sprayed. The Final Office Action admits that the adhesive layer in Gorynin is formed by plasma spraying. Aside from the deficiencies in the rejection of independent claim 1, applicants respectfully point out that the reliance on Rondeau to supply the teaching of electric arc spraying does not establish a *prima facie* case of obviousness. The Examiner relies on Rondeau for the alleged teaching that electric arc spraying can be used to spray an alloy of Ni-Al onto a substrate to establish a diffusion bond between the Ni-Al coating and the substrate at a lower cost than the

plasma spraying method of Gorynin et al. Applicants respectfully point out Rondeau does not pertain to catalyst members or teach or suggest the problem of improving the bonding of an anchor layer and a catalyst formed on such an anchor layer. Instead, Rondeau merely pertains to forming a bond between a substrate and an alloy layer. There is no discussion whatsoever in Rondeau of a catalyst layer disposed on the electric arc-deposited alloy. Furthermore, there is no teaching or suggestion of applying a Ni-Al to a conformable carrier. There is no teaching or suggestion in Rondeau of improving the bonding between an intermediate layer and a catalyst layer formed thereon. At most, the examiner has established a case of obvious to try, which is not sufficient to establish obviousness. The Examiner's stated position appears to be based on impermissible hindsight based on applicants' disclosure, and not from any fair teaching or suggestion found in Rondeau or Gorynin et al.

The examiner further optionally relies on Ishida for teaching electric arc spraying. However, as noted above, Ishida teaches away from conformable catalyst members, as Ishida teaches that the plate members should be resistant to bending. Accordingly, the skilled artisan reading Gorynin seeking to make a conformable catalyst would not substitute electric arc spraying on rigid plate members. Applicants respectfully request reversal of the rejection of claim 6.

Claim 31

Claim 31 depends from claim 1 is directed to a refractory metal carrier of wherein the tube includes an elongate body portion which is dimensioned and configured to be mounted within a curved or bent pipe having an open discharge end, the carrier having

coated thereon an anchor layer suitable for having a catalytic coating applied thereto, the carrier having a distal end and a proximal end, the proximal end comprising a mounting member dimensioned and configured to be secured to the open discharge end of the pipe when the body portion of the carrier is disposed within the pipe.

Claim 31 is not specifically addressed in the final office action. There is no citation to any passage in Gorynin or EP 0831211 that teaches or suggests a tube that includes an elongate body portion which is dimensioned and configured to be mounted within a curved or bent pipe having an open discharge end or a mounting member dimensioned and configured to be secured to the open discharge end of the pipe. Because the Final Office Action fails to establish a *prima facie* case of obviousness, the rejection should be reversed.

Claim 32

Claim 32 depends from claim 31 and is directed to a refractory metal carrier wherein the mounting member comprises an annular collar defining a mounting flange which is disposed radially outwardly of the proximal end of the catalyst member and extends in the direction from the proximal end towards the distal end thereof, whereby to define between the mounting flange and the proximal end of the catalyst member an annular slot which is dimensioned and configured to receive therein the open discharge end of the pipe, when the body portion of the carrier is disposed within the pipe.

The specific limitations to the annular collar, mounting flange, and annular slot are not taught or suggested in Gorynin or EP 0831211. Claim 32, like claim 31, is not specifically addressed in the Final Office Action. As such, the Office Action fails to

establish that claim 32 is obvious over the cited references and the rejection should be reversed.

Claim 34

Claim 34 is directed to a refractory metal carrier comprising a plurality of perforated plate members having opposite faces and disposed in a face-to-face linear array to impart a cylindrical shape to the carrier and to form accordion pleats, the plate members having protrusions extending from their faces which space adjacent plate members from each other, the carrier having coated thereon an intermetallic anchor layer adapted for use in a conformable catalyst member that can be placed in a bent or curved configuration.

The combined teachings of Gorynin and EP 0831211 do not teach the structure recited in claim 34, namely a plurality of perforated plate members in a face-to-face linear array to form a cylindrical sheet to the carrier and to form accordion pleats, the plate members having protrusions extending from their faces. Claim 34 is not specifically addressed in the Final Office Action and thus fails to establish that claim 34 is obvious. As such, the rejection of claim 34 should be reversed.

Conclusions

In view of the foregoing, claims 1-3, 5-6, 31-34, and 36 are not obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 4,455,281 (Ishida) in view of EP 0831211.

Claims 30 and 35 are not obvious under 35 U.S.C. § 103(a) over Ishida in view of EP 0831211, and further in view of U.S. Patent No. 4,798,770 (Donomoto) or U.S. Patent No. 6,042,879 (Draghi).

Claims 1-3, 5-6, 30-36 are not obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 5,204,302 (Gorynin) in view of EP 0831211, and optionally further in view of U.S. Patent No. 4,027,367 (Rondeau) and Ishida.

The undersigned was authorized by Richard A. Negin, Reg. No. 28,649, an attorney of record in the subject application, to prepare and file this Appeal Brief on behalf of the Assignee. Correspondence should be directed to Chief Patent Counsel, BASF Catalysts LLC, 101 Wood Avenue, P.O. Box 770, Iselin, NJ, 08830-0770.

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Claims Appendix

1. A refractory metal carrier comprising a tube of corrugated construction, the carrier having coated thereon an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent, the carrier being adapted for use in a conformable catalyst member.

2. The carrier of claim 1 having a plurality of perforations formed around the periphery of the tube.

3. The carrier of claim 1 having a catalytic coating on the anchor layer to provide a conformable catalyst member.

5. The carrier of claim 1, wherein the tube of corrugated construction comprises alternating rings separated by annular webs.

6. The carrier of claim 1 wherein the anchor layer is electric arc sprayed.

30. The carrier of claim 1 wherein the intermetallic anchor layer is selected from the group consisting of nickel, Ni/Cr/Al/Y, Co/Cr/Al/Y, Fe/Cr/Al/Y, Co/Ni/Cr/Al/Y, Fe/Ni/Cr, Fe/Cr/Al, Ni/Cr, Ni/Al, 300 series stainless steels, 400 series stainless steels, Fe/Cr and Co/Cr, and mixtures of two or more thereof.

31. The carrier of claim 1 wherein the tube includes an elongate body portion which is dimensioned and configured to be mounted within a curved or bent pipe having an open discharge end, the carrier having coated thereon an anchor layer suitable for having a catalytic coating applied thereto, the carrier having a distal end and a proximal end, the proximal end comprising a mounting member dimensioned and configured to be secured to the open discharge end of the pipe when the body portion of the carrier is disposed within the pipe.

32. The carrier of claim 31 wherein the mounting member comprises an annular collar defining a mounting flange which is disposed radially outwardly of the

proximal end of the catalyst member and extends in the direction from the proximal end towards the distal end thereof, whereby to define between the mounting flange and the proximal end of the catalyst member an annular slot which is dimensioned and configured to receive therein the open discharge end of the pipe, when the body portion of the carrier is disposed within the pipe.

33. The carrier of claim 32 having a catalytic material coated on at least some of the body portion of the carrier, to provide a catalyst member.

34. A refractory metal carrier comprising a plurality of perforated plate members having opposite faces and disposed in a face-to-face linear array to impart a cylindrical shape to the carrier and to form accordion pleats, the plate members having protrusions extending from their faces which space adjacent plate members from each other, the carrier having coated thereon an intermetallic anchor layer adapted for use in a conformable catalyst member that can be placed in a bent or curved configuration.

35. The refractory metal carrier of claim 34, wherein the intermetallic anchor layer is selected from the group consisting of nickel, Ni/Cr/Al/Y, Co/Cr/Al/Y, Fe/Cr/Al/Y, Co/Ni/Cr/Al/Y, Fe/Ni/Cr, Fe/Cr/Al, Ni/Cr, Ni/Al, 300 series stainless steels, 400 series stainless steels, Fe/Cr and Co/Cr, and mixtures of two or more thereof.

36. The carrier of claim 34 having a catalytic coating on the anchor layer to provide a conformable catalyst member.

Evidence Appendix

None.

Related Proceedings Appendix

None.